Simulations results for CD-1: Jet Structure TG

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Major efforts in JS TG

- Photon performance in *pp* and Au+Au
  - ➡ sustained effort by Ohio U (Justin, Abinash, Tyler) and Michigan U (Joe)
  - ➡ but not yet "higher-level" performance like isolation atop UE background in Au+Au, purities based on expected γ / π^0 rates
- Porting ("ATLAS-style") UE combinatoric subtraction to sPHENIX framework
  - ➡ mission critical for all-things-jet and photon isolation in Au+Au
  - ➡ happy to have attention to this critical effort from Columbia U (Sarah)
- Emulator to study calo-based L1 trigger performance for jets and photons in *p*+*p*, *p*+A (and A+A, for high-lumi running scenarios)
  - ➡ Colorado group (DVP, Kurt, Jamie), also some work on quarkonia trigger by ISU (Sasha)
- Recently, interest in JEWEL simulations of jet physics observables at RHIC
  - ➡ Rutgers U group (Sevil, Raghav)
- Difficult to find person-power for other high-priority efforts (jet substructure performance, "Particle Flow"-style jet reco, etc.)

Simulation needs

- In the past, Jet Structure TG has been most effective with specific charge & deadline
- Major need #1: consistent “tag” of detector configuration & reconstruction options for all topical groups (or “tags”, e.g. w/ & w/o MVTX?)
  - ➡ then, can begin to coordinate a common set of G4 simulations for CD-1 review work (thus, a control on the provenance of any plots)
- Major need #2: more specificity (from sPHENIX mgmt? from BNL or DOE ?) about needed CD-1 review results, three examples:
  1. running scope: e.g. is there a “5-year” running plan with high-lumi Au+Au running? changes focus of trigger sim needs, projections, etc.
  2. balance: focus on remaking “core” metrics in original MIE (jet response, resolution vs. centrality/R/p_T with latest G4) vs. demonstrate ability to keep up with latest physics developments (z_g, γ-tagged FF, etc.)?
  3. timeline: what should be prepared for Director’s Review (when in summer?), for draft CDR (1 May?), etc.

Possible list of plots

- Basic performance metrics: ability to measure photons, jets & sub-jets, charged particles in *p*+*p* and Au+Au
  - ➡ biggest challenges for either case: UE subtraction, coordinating large Hijing simulation campaign
- "Compound" metrics or observables: unfolding challenge, fake jet rejection (or triggered away-side jet purities), FF sensitivity to z-jet-response correlations, etc.
  - ➡ biggest challenge: longer timescale, need solid understanding of basic metrics first
- Statistical projections for singles & correlation yields in 3 systems
  - ➡ status: need input on expected data-taking timeline
- Trigger (photon, jet, quarkonia) efficiencies & rejections
  - ➡ status: in development
- Expected signatures from jet quenching simulations
  - ➡ status: used mix of various models/calculations in original MIE; for a rebooted effort, would propose to focus on JEWEL